New Alloys for High Pressure Die Casting

AlMgSiMn

✶ Main Features

- Combination of moderate strength and high ductility in as cast (temper F) condition
- Good corrosion resistance
- Good weldability

✶ Applications

For the production of highly ductile components in high pressure die casting (HPDC):

- Car Body components
- Engine brackets
- Crash test involved parts
- Chassis components

✶ Chemical Composition

A variety of alloy compositions can be selected within the AlMgSiMn alloy system, the actual composition to be designed must be based on the combination of elongation and strength to be obtained. Usually, the alloys contain Mg in the range from 1 to 5wt-% and Si from 0.2 to 2wt-%. For each alloy, the Mg/Si ratio is optimised to achieve the best combination of properties. The Mn content ranges typically from 0.7 to 1.3wt-%.

✶ Typical Mechanical Properties

Typical mechanical properties, i.e. combination of strength and elongation, achieved for a number of alloys (different Mg, Si combinations) are shown in the figures below (data from tensile test specimen out of 2.5mm plates).